Confectionery Processing

Level-II

Based on May 2019, Version 2 Occupational standards

Unit of Competence: - Operate a Boiler

Module Title: - Operating a Boiler

LG Code: IND COP2 M19 (LO1-7)-(LG-60-66)

TTLM Code: IND COP2 TTLM19 1020v1

October, 2020

United Nations Educational, Scientific and Cultural Organization

Table of Contents

LG #60	LO #1 Prepare the boiler for operation

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying and reporting health and safety hazards.
- Purging the boiler.
- Confirming the available services
- Conducting pre-operational checks to confirm operational status of boiler

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify and report health and safety hazards.
- Purge the boiler.
- Confirm the available services
- Conduct pre-operational checks to confirm operational status of boiler

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- Identifying and reporting health and safety hazards

1.1 Identifying and reporting health and safety hazards on boiler operation

Hazard is defined in Standard as ‘a biological, chemical or physical agent in, or condition of, food that has the potential to cause an adverse health effect in humans’

"Health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, and neurotoxins, agents which act on the hematopoietic system and agents which damage the lungs, skin, eyes, or mucous membranes. Health hazards include pollution, harmful emissions, exposure to toxic substances etc.

- Five basic methods you can use to identify workplace hazards before an accident occurs**.**
  - informal observations, and formal observation programs;
  - comprehensive company-wide surveys;
  - individual interviews;
  - walk-around inspections; and
  - Documentation review.

Fig1 Identifying hazards

❖ Health and safety is: A hazard is any source of potential damage, harm or adverse health effects on something or someone.

Safety is a state of being protected from potential harm or something that has been Designed to protect and prevent harm. An example of safety is when you wear a Seat belt. An example of safety is a safety belt. Safety is the state of being "safe".

❖ Hazards may include to:

- working around hot surfaces
- manual handling
- steam, hot gasses and fuel leaks

❖ To be sure that all hazards are found**:**

1. Look at all aspects of the work and include non-routine activities such as Maintenance, repair, or cleaning.
2. Look at the physical work environment, equipment, materials, products, Include how the tasks are done.
   Look at injury and incident records.

❖ 8 elements of total safety management

- Management Leadership and Organizational Commitment.
- Hazard Identification and Assessment.
- Hazard Control.
- Ongoing Inspections.
- Qualifications, Orientation and Training.
- Emergency Response.
- Incident Investigation.
- Program Administration.

❖ Hazard Analysis Critical Control Point system, is a way of ensuring that food is safe

❖ There are three types of hazards are listed below.

1. Microbiological Hazards
2. Chemical Hazards
3. Physical Hazards

1.1.1 Report health and safety hazards to appropriate person

- Separate Useless/expired machine from boiler operation area
- Boiled water storage tank disinfection problem
- Boiler machine breakdown

Self-Check 1	**Written Test**

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false (3points)

1. Hazard Analysis Critical Control Point system, is a way of ensuring that food is safe

Test II: Choose the best answer

1. Which one of the following basic methods to Identify workplace hazards before an Accident (3point)

A. Individual interviews;

B. Walk-around inspections; and

C. Documentation review

D. All

Test III: Short answer

2. List the three types of hazards (4points)

_____

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Purging the boiler

2.1 Purging the boiler

Purging a boiler is a simple way of saying that you are going to get the air out of the water can run freely. Air bubbles stop water flow and need to be purged, or the boiler will not function. Pre-Purge is to exhaust unburned gas in a combustion chamber before ignition by exhauster so that gas explosion can be prevented. Pre-Purge is done before ignition. It is called as Post-Purge to exhaust forcibly after shutting off the burning.

- Purging the boiler is required as the name implies is nothing but the cleaning of system before taking in to operation.
- Purging is the main permissive for boiler light up
- Boilers [basic] may include to:-
    - Single fixed combustion air supply
    - Non-modulating single heat source
    - Fixed firing rate.

Fig 1 purging the boiler system

Boiler pressure is controlled by the expansion vessel, the balance of air versus water in your central heating system

Fig 1 boiling system

- Purging is required with purging, a gas is used to protect the weld seam until it has cooled to the point that oxidation no longer can occur. Usually, an inert gas, such as argon which is heavier than air, is used other purging gases such as nitrogen and nitrogen/hydrogen blends can also be used.

Self-Check 2	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Purging is the main permissive for boiler light up (3point)

Test II: Choose the best

1. Which one of the following may include to Boilers [basic] (3point)
   A. Single fixed combustion air supply
   B. Non-modulating single heat source
   C. Fixed firing rate.
   D. All

Test III: Short answer

2. Define boiler purging (4points)

_____

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points
You can ask you teacher for the copy of the correct answers

Information Sheet 3- Confirming the available services

3.1 Confirming the available services of boiler operation

- Services may include to**:-**
  - Can include fuel supply of bagasse, coal, gas, oil or other fuel types, steam, mill and instrumentation air, cooling water, general mill water supply and Cooling water.

When steam condenses, its volume is dramatically reduced, which results in a localized reduction in pressure. This pressure drop through the system creates the flow of steam through the pipes. The steam generated in the boiler must be conveyed through the pipework to the point where its heat energy is required. Initially there will be one or more main pipes or steam mains which carry steam from the boiler in the general direction of the steam using plant. Smaller branch pipes can then distribute the steam to the individual pieces of equipment.

Fig.1 boiler

Fig 2 steam Boiler

Self-Check 3	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Bagasse, coal, gas and oil Boiler Services may include fuel supply of (5points)

Test II: Choose the answer

1. Which one of the following Services may include (5point?)

A. cooling water,

B. general mill water supply

C. Cooling water

D. All

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 4- Conducting pre-operational checks to confirm operational status of boiler

4.1 Conducting pre-operational checks to confirm operational status of boiler

Pre-operational check is important for the workers safety. It involves a daily check of the boiler machines health. Any boiler or production machine that needs repairs, maintenance or is observed to be unsafe to operate has to be taken out until such repair or maintenance has been done. Check to ensure there is a fire extinguisher, First aid kit, and any tools or supplies that you will need to perform your task. Check that the communication system, such as CB or two-way radio, is operational. If using a cell phone, make sure to keep it on your person. Don't leave it in the tractor.

- The purpose of a pre-operation check is to make sure that no hazards exist before you start your production for the day. Find out what you should be checking as part of these checks.

Fig.1 pre-operational checks

- Equipment status may include to:
  - Conducting relevant pre-start checks
  - Confirming that cleaning standards are met
  - All safety guards and manholes are in place
  - Equipment is operational

- A pre-start inspection involves a routine examination of a piece of equipment by its operator that is standardized via a checklist. Whether it be a light vehicle, heavy vehicle, mobile plant or tools, pre-start inspections are an important task with financial, and more importantly, safety implications.

- The purpose of inspection is to check whether the product is manufactured according to the standards and specification by checking the products randomly.
- The pre-operation inspection helps to:
  1. Reduce the risk of injury to you due to defective equipment.
  2. Verify that the equipment you will operate is in safe working order

- The purpose of an inspection is to identify whether work equipment can be operated, adjusted and maintained safely with any deterioration detected and remedied before it results in a health and safety risk. The need for inspection and inspection frequencies should be determined through risk assessment.

- Check that the outer cover of the equipment is not damaged in a way that will give rise to electrical or mechanical hazards. Check for burn marks or staining that suggests the equipment is overheating. Position any trailing wires so that they are not a trip hazard and are less likely to get damaged.

Self-Check 4	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. The purpose of a pre-operation check is to make sure that no hazards exist (3point)

Test II: Choose the best

_____1.Involves a routine examination of a piece of equipment by its operator that is standardized via a checklist (3point)

A. pre-start inspection B. Memtenance C. A and B

Test III: Short answer

1. What is pre-start check(4point)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Operation Sheet 1- Conducting Pre-start checks

Procedure

Step 1: Apply PPE and prepare boiler operation equipment for starting boiling.

Step 2: Check operating machine functionality

Step 3: Check boiler equipment line and breaker

Step 4: Disinfection boiler equipment by using recommended detergent

Step 5: Start boiler operation

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1:30. The project is expected from each student to do it.

Task- 1. Pre-start checks of boiler operation

LG #61	LO #2 Start and monitor boiler operation

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Starting and brought the boiler on line safely
- Operating plant within limits of manufacturer's specifications
- Monitoring equipment status to confirm operating condition
- Testing and adjusting water quality
- Circulating sluice water to remove ash from boiler
- Meet the workplace housekeeping standards

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Start and brought the boiler on line safely
- Operate plant within limits of manufacturer's specifications
- Monitor equipment status to confirm operating condition
- Test and adjust water quality
- Circulate sluice water to remove ash from boiler
- Meet the workplace housekeeping standards

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- Starting and brought the boiler on line safely

1.1 Starting and brought the boiler on line safely

To start heat the boiler slowly will be explained throughout this procedure and it can take many hours for a large cold boiler to be heated correctly to operating temperature and pressure. Timing will also depend on how much treated water is available to fill the boiler, so be prepared for a long day and you may have to include a shift handover procedure to safely complete the task.

❖ Attention to start the boiler:

1. Under no circumstances should the boiler be left unattended until all of the Following steps have been completed and the boiler is up to pressure and Temperature and back on-line if appropriate.
2. Also take care when handling chemicals or working on live steam etc.; always That PPE appropriate to the task is worn.
3. Also remember that most accidents in boiler houses are falling from height.

Fig 1 Starting and brought the boiler

Working at height can include pits and trenches as a “working at height hazard”. The following points have been carefully put together to help you bring a cold steam boiler back into service and back on-line safely.

Fig 2 Boiler checking process

Self-Check 1	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1**.** Working at height can include pits and trenches as a “working at height (5point)

Test II: Short answer

1. Write the attention to start the boiler (5point)

_____

_____

Note: Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Operating plant within limits of manufacturer's specifications

2.1 Operating plant within limits of manufacturer's specifications

The manufacturing systems differ in structure or physical arrangement. Manufacturing specification contains all the information that is needed to make the product.

- Manufacturer's specifications of boiler is temperature, working pressure, capacity, steam level, type, safety valve pressure, fuel used
- A boiler system includes the boiler itself, associated piping and valves, operation and safety controls, water treatment system, and peripheral equipment such as pollution Control devices, economizers, or super heaters (*Plant Engineering*, 1991).

Fig 1 manufacturing plant operating system

There are four kinds of classical manufacturing systems and two modern manufacturing systems

- The modern manufacturing systems are
  1. Linked cell system (Cellular manufacturing system)
  2. Flexible manufacturing system (FMS)
- The classical systems are
  1. Job shop
  2. Flow shop
  3. Project shop
  4. Continuous process

Self-Check 2	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Start, operate, monitor and adjust process equipment to achieve required outcomes (5point)

Test II: Choose the best answer

1. Which one of the following are modern manufacturing systems (3point

. A. Linked cell system (Cellular manufacturing system)

B. Flexible manufacturing system (FMS)

C. A and B

D. All

Test III: Short answer

1. What is the basic operating principles of equipment (5point)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet 3- Monitoring equipment status to confirm operating condition

3.1 Monitoring equipment status to confirm operating condition

Monitoring is the systematic process of collecting, analyzing and using information to track a programmer's progress toward reaching its objectives and to guide management decisions. Workers have to monitor the equipment's operation correctly and report tools/equipment malfunctions or problems according to procedures to his immediate supervisors.

Fig 1 Monitoring equipment status

There are the obvious functions of monitoring and controlling the process for reasons of safety and product specification. Additionally, there is invaluable information to be gained from the process parameters that can give an understanding of the current health of the asset.

- Equipment status May include to:
  - Conducting relevant pre-start checks
  - Confirming that cleaning standards are met
  - All safety guards and manholes are in place
  - Equipment is operational

❖ **Monitoring** is the ongoing process of observing project or program activities to determine the rate of progress toward the achievement of a goal. The information gathered as a result of monitoring is used to arrive at an analysis of progress, highlighting weaknesses that require management attention.

❖ There are five types of monitoring in M&E and they include

- Process monitoring,
- Technical monitoring,
- Assumption monitoring,
- Financial monitoring and
- Impact monitoring.

1. Process monitoring: - is enables the control of critical steps in a manufacturing process, thereby enabling the control that will ultimately avoid failure

2. Technical monitoring: - is relates to the supervision of project implementation, where a dedicated expert keeps track of progress through regular (including unannounced) inspections and observations at the project site or during specific activities (e.g. trainings, etc.).

3. Assumption monitoring; - is must hold true for a strategy or project to be achieved, Missions should devise ways to track assumptions.

4. Financial monitoring: -is the project concerns comparing the actual costs to the Planned costs in the project budge. Monitor the financial performance of the organization to ensure that targets are being met.

5. Impact monitoring: - is a type of monitoring which continually assesses the impact of project activities to the target population

Condition Monitoring has historically focused on the acquisition and analysis of measurable parameters that would give useful information as to the condition of machine components and, hence, a forecast of the likely serviceability of the machine.

There are three basic categories of monitoring: - technical monitoring, functional monitoring and business process monitoring.

Monitor the performance of your steam system using our truly wireless machine monitoring solution. Detect leaks in real time on steam equipment including steam traps, boilers, heat exchangers, actuators, economisers, air handlers, heat recovery units and pipework. Once installed our equipment sensors increase productivity, safety and reduce quality control issues.

❖ Elements measured

Power (electrical power, energy efficiency, consumption data & power analysis)

Temperature and humidity (contact & non-contact)

Pressure (air, gas, steam & water)

Vibration (motors, gearboxes & mechanical assemblies)

Fig 2 medium boiler operation equipment

Self-Check 3	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false (3point)

1. Monitoring is the systematic process of collecting, analyzing and using information

Test II: Choose the best

1. Which one of the following is monitoring equipment status May include (3point)
   A. Conducting relevant pre-start checks
   B. Confirming that cleaning standards are met
   C. All safety guards and manholes are in place
   D. All

Test III: Short answer

1. Write three basic categories of monitoring (4point)

_____

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet 4 Testing and adjusting water quality

4.1 Testing and adjusting water quality

Water quality sampling and test procedures including the purpose of test and safe use, care and storage of relevant test equipment, interpretation and recording of results. Water quality monitoring is commonly defined as the sampling and analysis of water (lake, stream, river, estuary, or ocean) and conditions of the water body.

Fig 1 Water quality sampling and test procedures (PH meter)

Fig 2 Testing procedures (PH paper)

- The objective of water quality monitoring is to obtain quantitative information on the physical, chemical, and biological characteristics of water via statistical sampling
  - Water Quality Indicators
  - Temperature and dissolved oxygen.
  - Conventional variables (pH, total dissolved solids, conductivity, and suspended
  - sediment)
  - Nutrients.
  - Metals.
  - Hydrocarbons.
- Six ways to testing and monitoring the waste water quality, encouraging a clean and healthy aquatic ecosystem.

1. CDOM/FDOM Monitoring.
2. Chlorophyll Fluorescence Analysis.
3. Conductivity, Salinity, and TDS Monitoring.
4. Recording the Water Temperature.
5. Measuring the Dissolved Oxygen Levels.
6. PH and KH Testing.

Self-Check 4	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Water quality monitoring is commonly defined as the sampling and analysis of water (3points)

Test II: Choose the best answer

1. Which one of the following is water quality Indicators (3point?)

   A. Nutrients.

   B. Metals.

   C. Hydrocarbons

   D. All

Test III: Short answer

1. Write at least three water Quality Indicators (4points)

_____

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet 5 Circulating sluice water to remove ash from Boiler

5.1 Circulating sluice water to remove ash from boiler

Water sluice is an artificial channel for conducting water, often fitted with a gate (sluice gate) at the upper end for regulating the flow. The body of water held back or controlled by a sluice gate. Water Sluice refers to a movable gate allowing water to flow under it. When a sluice is lowered, water may spill over the top, in which case the gate operates as a weir. Usually, a mechanism drives the sluice up or down. This may be a simple, hand-operated, chain pulled/lowered, worm drive or rack-and-pinion drive, or it may be electrically or hydraulically powered.

Fig 1 sluice water

5.1.1 Types of sluice gates

1. **Flap sluice gate**

A fully automatic type, controlled by the pressure head across it; operation is similar to that of a check valve. It is a gate hinged at the top. When pressure is from one side the gate is kept closed; a pressure from the other side opens the sluice when a threshold pressure is surpassed.

2**. Vertical rising sluice gate**

A plate sliding in the vertical direction may be controlled by machinery.

3**. Radial sluice gate**

A structure, where a small part of a cylindrical surface serves as the gate, supported by radial constructions going through the cylinder's radius. On occasion, a counterweight is provided.

4. Rising sector sluice gate

Also a part of a cylindrical surface, which rests at the bottom of the channel and rises by rotating around its center.

Needle sluice is formed by a number of thin needles held against a solid frame through water pressure as in a needle dam

5.1.2 Types of material used for sluice gates

- Wood

Traditionally wood was the material of choice for sluice gates.

- Cast iron

Cast iron has been popular when constructing sluice gates for years. This material is great at keeping the strength needed when dealing with powerful water levels.

- Stainless steel

In most cases, stainless steel is lighter than the older cast iron material.

Boiler ash handling and recovery system is designed to remove unburned carbon (char), ash, grit and sand from waste water discharged from wood and bark power boiler.

Self-Check 5	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Water sluice an artificial channel for conducting water, often fitted with a gate (3points)

Test II: Choose the best answer

1. Which one of the following are types of material used for sluice gates (3point?)

A. Wood
B. Cast iron
C. Stainless steel
D. All

Test III: Short answer

1. Define water sluice (4points)

_____
_____
_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet- 6 Meet the workplace housekeeping standards

6.1 Meet the workplace housekeeping standards

Effective housekeeping can help to control or eliminate workplace hazards. Poor housekeeping practices frequently contribute to incidents. If the sight of paper, debris, clutter and spills is accepted as normal then other more serious hazards may be taken for granted.

Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly, maintaining halls and floors free of slip and trip hazards, and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is also a basic part of incident and fire prevention.

Fig 1 good housekeeping standards

- ❖ Principles and procedures of good housekeeping in the workplace Practice
- Ensure all spills are immediately cleaned up.
- Maintain clean light fixtures to improve lighting efficiency.
- Keep aisles and stairways clear.
- Regularly inspect, clean and repair all tools.

5S or good housekeeping involves the principle of waste elimination through Work place organization. 5S (sort, set in order, clean, standardize, and sustain.) Workplace housekeeping checklist is a tool used to ensure that the workplace is well organized, hygienic, and safe for all employees.

Good housekeeping prevents workplace hazards such as slips, trips, falls, and more.

- ❖ Standards of housekeeping
- The different standards of cleaning for different surfaces and areas, as follows:
- Physically clean
- Chemically clean
- Bacteriologically clean
- Entomologically clean
- Terminally clean
- Regular Cleaning of Guest Rooms Vs. Deep Cleaning

- ❖ **Purpose of workplace housekeeping**

Poor housekeeping can be a cause of incidents, such as:

- tripping over loose objects on floors, stairs and platforms
- being hit by falling objects
- slipping on greasy, wet or dirty surfaces
- striking against projecting, poorly stacked items or misplaced material
- cutting, puncturing, or tearing the skin of hands or other parts of the body on projecting nails, wire or steel strapping

- ❖ **Benefits of effective good housekeeping practices results in**

- reduced handling to ease the flow of materials
- fewer tripping and slipping incidents in clutter-free and spill-free work areas
- improved productivity (tools and materials will be easy to find)
- lower worker exposures to hazardous products (e.g. dusts, vapors)
- better control of tools and materials, including inventory and supplies
- more efficient equipment cleanup and maintenance
- better hygienic conditions leading to improved health
- more effective use of space

❖ Clean our work environment/work place

1) Use proper storage for everything.
2) Move to a paperless office.
3) Organize your boiler and the like cables.
4) Don't eat at your desk.
5) Clean workplace by using recommended detergents

Self-Check 6	**Written Test**

Name…… ID…… Date…….
Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

. 1. Effective housekeeping can help control or eliminate workplace hazards (3points)

Test II: Choose the best answer

1. Principles and procedures of good housekeeping in the workplace Practice (3point?)

A. Ensure all spills are immediately cleaned up.
B. Maintain clean light fixtures to improve lighting efficiency.
C. Keep aisles and stairways clear.
D. All

Test III: Short answer

1. Write at least three benefits of effective good housekeeping practices results in (4points)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Operation sheet - 2	Testing and adjusting water quality

Procedure

1. Apply PPE and Prepare and adjust equipment's which is used for testing purpose.
2. Prepare chemicals which are used for testing water quality.
3. Prepare water for testing
4. Test and adjust water quality by using testing chemicals and equipment's (e.g.PH Meter, PH paper)
5. Separate tested quality water from dispose water
6. Dispose the residue part/waste in recommended area
7. Store quality water in correct or proper manner

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour. The project is expected from each student to do it.

Task-1 Testing and adjusting water quality

LG #63	LO #2 Analyze and respond to abnormal performance

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Analyzing Operating data and plant operating conditions to identify causes of abnormal performance
- Taking corrective action
- Implementing emergency procedures

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Analyze Operating data and plant operating conditions to identify causes of abnormal performance
- Take corrective action
- Implement emergency procedures

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1 Analyzing Operating data and plant operating conditions to identify causes of abnormal performance

1.1 Analyzing Operating data and plant operating conditions to identify Causes of abnormal performance

Abnormal conditions (process disturbances or operations that deviate from optimal Performance) in plant environments that are not resolved quickly can definitively lead to incidents resulting in economic loss along with safety and environmental issues. Abnormal conditions – situations occurring within a process that deviates from planned courses of production that could have significant impact on the enterprise's safety, cost, and efficiency

Production/Operation management is the process which combines and transforms various resources used in the production/operation subsystem of the organization into value added products/services in a controlled manner as per the policies of the organization.

Symptoms of an abnormal condition appear on boiler operator control room screens in the form of alarms.

Fig.1 analyzing operating data during abnormal condition

Self-Check 1	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Symptoms of an abnormal condition appear on boiler operator control room screens in the form of alarms. (3point)

Test II: Choose the best answer

1 Which one of the following is significant impact of abnormal conditions situations Occurring within a process (3poin)?

A. Enterprise's safety B., Cost C. Efficiency D. All

Test III: Short answer

1. Write the causes of abnormal performance (4points)

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2	Taking corrective action to hazards, out-of-specification test results and/or plant performance

2.1 Taking corrective action to hazards, out-of-specification test results and/or Plant performance

Hazard is a potential that cause harm to the consumer. Foods can become unsafe and have the potential to cause harm through hazards. They cause harm by spoiling of food, or causing sickness, disease, or death in people consuming the food.

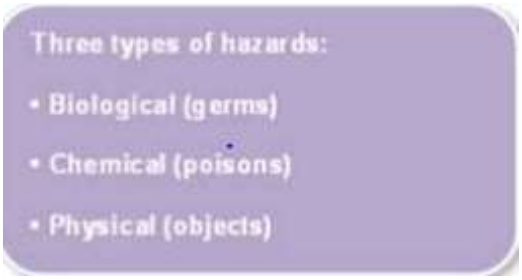

Fig 1 hand microscope

2.1.1 Taking corrective action to hazards

Actions are identified and implemented to reduce or eliminate the hazard.

Hazards may include:-

- working around hot surfaces
- manual handling
- steam, hot gasses and fuel leaks

- Testing result

  Biological testing result of microorganisms is harmful micro-organisms such as bacteria, viruses, helminthes, protozoa, algae, and certain toxic products they may produce. For example, Salmonella, Escherichia coli, Listeria, Yersinia, Safe work procedures including awareness of health and safety hazards related to waste water system operation and associated control measures. Hazard analysis each

Hazard identification is the identification of biological, chemical, and physical agents capable of causing adverse health effects and which may be present in a particular food or group of foods. Risk characterization the qualitative and/or quantitative estimation of the probability of occurrence and severity of adverse health effects.

Self-Check 2	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Hazard is a potential that cause harm to the consumer (3point)

Test II: Choose the best answer

1. Which one of the following is types of hazards(3points)

A. Biological hazard B. Physical hazard C. Chemical hazard D. All

Test III: Short answer

2. List three types of hazard (4points)

_____

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 3 Implementing emergency procedures

3.1 Implementing emergency procedures

Emergency procedure is identifying the responsibilities, actions and resources necessary to deal with an emergency. Once drafted, a procedure may require a consultative period with those who could be involved or affected by the emergency, and a program set out for testing, training and periodic review. Summoning the emergency services and continuing to liaise with them.

Implementing Emergency plan promotes safety awareness and shows the organization's commitment to the safety of workers. The lack of an emergency plan could lead to severe losses such as multiple casualties and possible financial collapse of the organization. Since emergencies will occur, preplanning is necessary.

Laboratories need to have procedures in place for how staff should deal with accidents and emergencies. General written procedures for first aid should be developed and made available to all staff so they know the first things to do, and who to call or notify in case of minor cuts and bruises, major wounds or skin contamination.

Fig 1 Emergency for fire

Emergency procedures should be in place in the workplace your emergency action plan must include the following:

- A preferred method for reporting fires and other emergencies;
- An evacuation policy and procedure;

Emergency escape procedures and route assignments, such as floor plans, workplace maps, and safe or refuge areas Practice and Review Your Emergency Action Plan.
The purpose of an EAP is to facilitate and organize employer and employee actions during workplace emergencies.

- The fundamental principles of emergency management are based on four phases – mitigation, preparedness, response and recovery**.**

❖ Emergency evacuation procedures

On hearing an evacuation alarm, or on instruction of emergency control personnel, immediately cease all activity and secure personal valuables. Assist any person in immediate danger, but only if safe to do so. In a fire, do not use a lift to evacuate a building.

Self-Check 3	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. The purpose of an EAP is to facilitate and organize employer and employee actions during workplace emergencies (3point)

Test II: Choose the best answer

1. Emergency procedures action plan must include (3points)
   A. A preferred method for reporting fires and other emergencies;
   B. An evacuation policy and procedure
   C. A and B
   D. All

Test III: Short answer

2. Write the purpose of an EAP **(**Emergency Action Plan) (4points)

_____

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answer

Operation sheet 1	Taking corrective action in response to hazard out-of specification

Procedures

Step1. Analayize information on hazards

Step2. Identify critical control point (CCP)

Step3. Evaluate information on hazards (Biological, chemical or physical hazards)

Step3. Understand hazards of critical place

Step4. Take corrective action

LAP TEST	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour. The project is expected from each student to do it.

Task1. Take Corrective action on hazards of boiling

LG #88	LO4. Handover boiler operations

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- . Maintaining workplace records.
- Carrying out handover according to workplace procedure.
- Awaring boiler operators

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Maintain Workplace records
- Carry out handover according to workplace procedure.
- Aware boiler operators

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- Maintaining Workplace records

1.1 Maintaining Workplace records

Workplace records are an important part of any work environment and should be accurately boiler maintained within the required timeframes

❖ Importance of workplace records

- For continuous monitoring of quality system
- For specimen tracking throughout process
- To identify failures in equipment
- To revisit information; reference
- For use as a management tool

❖ Workplace information

- batch/recipe instructions
- verbal or written operating procedures
- specifications: detailed description of design criteria for a piece of work

Production schedules

Fig 1 Workplace records

- ❖ Types of workplace records
- ❖ Staff records
    - These are records relating to any and all aspects of staffing the premises. May be divided into overall records and individual staff records
- ❖ Overall records
    - ✓ Staffing rosters
    - ✓ Training details by operational area
    - ✓ Annual leave planning chart
    - ✓ Salary and overtime payments
    - ✓ Injury records.
- ❖ Individual staff records
    - ✓ Leave records
    - ✓ Record of uniform orders
    - ✓ Training schedule
    - ✓ Direct salary deduction details
    - ✓ Injury claims.
- ❖ Types of records

Staff may be given required to complete records such as:

- Time sheets
- Requisitions
- Internal transfers
- Requests for maintenance
- Daily takings sheets

Self-Check 1	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1**.** Workplace records are an important part of any work environment (3point)

Test II: Choose the best answer

1. Which one of the following is true about records essential (3points)

A. For continuous monitoring of quality system B. To identify failures in equipment

C. To revisits information; reference D. All

Test III: Short answer

2. Write five Types of records (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Carrying out handover according to workplace procedure.

2.1 Carrying out handover according to workplace procedure

❖ Handover responsibility procedure

- Handover according to the required legal or regulatory requirements, organizational health, safety, environmental and hygiene standards or instructions
- Take precautions to ensure that production is not interrupted during handover
- Maintain quality standards during task handover
- Provide information in accordance with organizational procedures
- Exchange information in accordance with organizational procedures

❖ Shift handover should be include

1. conducted face-to-face;
2. two-way, with both participants taking joint responsibility;
3. done using both verbal and written communication;
4. based on an analysis of the information needs of incoming staff;
5. Given as much time and resource as necessary.

❖ Key Components of a Handover Report

- The Precise Status of Ongoing Tasks. Specifically, this section entails a brief but detailed description of all the unfinished projects and tasks.
- Upcoming Deadlines.
- Forthcoming Events.
- Distinctive Roles

Self-Check 2	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Shift handover conducted face-to-face (3point

Test II: Choose the best answer

1. Which one of the following is key Components of a handover report (3points?)

A. Upcoming Deadlines.

B. Forthcoming Events.

C. Distinctive Roles

D. All

Test III: Short answer

1. Write at least three hands over responsibility (4point)

_____

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 3- Awaring boiler operators

3.1 Awaring boiler operators

The Aware boiler improves the bottom line by enabling a faster recovery, and therefore reducing the duration of forced outages. The Aware Boiler Integrity module is in use at over half the boilers in North America to improve reliability, availability and safety. When a tube failure occurs, personnel must quickly identify the material and/or stock number as well as the weld procedure to be used. With the Aware boiler integrity software, this information is available via any computer.

Boiler operators and technicians should pay close attention to three key safety devices to protect personnel, equipment, and the facility:

- Safety valves. The safety valve is the most important safety device in a boiler or domestic hot-water system.
- Water-level control and low-water fuel cutoff.
- Water-gauge glass.

Fig 1 boiler operating system

❖ Manage Boiler Inspection Workflow With Our Software

Aware can be used to manage your boiler inspection program and the flow of information and resulting work. The software guides an inspector by presenting forms to be filled in that are specific to each component (e.g. water wall, superheated. etc.), and each activity (e.g. visual inspection, UT Data, etc.).

❖ Boiler Integrity Management Software helps you avoid forced outages

Aware boiler integrity software provides the tools necessary to record, view, and report tube failures by displaying them on plant-specific interactive CAD drawings providing total Quality Assurance. This visual analysis tool, along with the powerful reporting and trending functions, allows engineers to have improved insight into the boiler's condition and how quickly the equipment is aging.

Self-Check 3	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Boiler Integrity Management Software helps you avoid forced outages (3point)

Test II: Choose the best answer

1. Which one of the following are types of boiler blow down (3points?)

A. Blow down control

B. Blow down vessels

C. Recommendations.

D. All

Test III: Short answer

1. Write three types of boiler blow down (4point)

_____

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

LG #87	LO5. Carry out an operational

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Shutting down the boiler.
- Identifying and reporting Maintenance requirements

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- . Shutdown the boiler.
- Identify and report Maintenance requirements

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- Shutting down the boiler.

1.1 Shutting down the boiler.

Boiler shut down normal operating level without further preparation. The valves, and take no further steps of preparation. “Wet layup” or a “dry layup”. Boilers are pressure vessels designed to heat water or produce steam, which can then be used to provide space heating and/or service water heating to a building.

Boiler operators and technicians should pay close attention to three key safety devices to protect personnel, equipment, and the facility:

- Safety valves the safety valve is the most important safety device in a boiler or domestic hot-water system.
- Water-level control and low-water fuel cutoff.
- Water-gauge glass.

1.1.1 Important part of a boiler

A boiler's heat exchanger is a pipe that runs through the main chamber and into the circulator pump. The boiler's burner assembly is positioned under the heat exchanger, heating the water as it flows through the pipe. The heat exchanger is one of the most important parts of the entire boiler system. Boiler Before closing up and filling the boiler, it must be inspected both internally and externally. The internal inspection is to make certain that it is free from scale, oil, tools, debris and other foreign material

❖ Shutting down a boiler When a boiler has to be removed from service for maintenance, inspection, or layup, the following procedure should be followed:

a. Before shutting the boiler down, give it a good blow down to remove as much Sediment as possible. Stop when the drain runs clear.
b. Put the boiler steam pressure control in manual mode, and slowly reduce the firing rate. Watch the main steam header pressure to make sure that the other boilers are taking up the load. Do not reduce the firing rate below that necessary to maintain a stable flame.

c. When the boiler is at the minimum firing rate the fuel can be shut off at the main gas cock. Alternatively, this is often a good time to test the low water level shutdown switch, or some other boiler interlock. If this method is chosen make sure you note it in the logbook.

d. Allow the fan to post-purge the furnace with a reduced air flow, and then shut the fan down. Be particularly careful not to let the fan supply large amounts of cold air into the furnace in the winter.

e. Close the boiler header stop valve. Open a steam drum vent valve when the boiler pressure drops to slightly above atmospheric pressure

❖ Boiler Shutdown

1. Power the burner off.
2. Shut off the fuel to the burner.
3. If equipped, open the superheated outlet drain valve.
4. Close the main steam stop valve(s), and open all drains.
5. Shut down the boiler feed system.

Fig 1 Boiler shutdown process

Self-Check 1	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1. Boiler shut down normal operating level without further preparation (3point)

Test II: Choose the best answer

1. Which one of the following are key safety devices to protect personnel, equipment of boiler operators and technicians (3points?)

A. Water-level control and low-water fuel cutoff.

B. Water-gauge glass.

C. A and B

D. All

Test III: Short answer

1. .Write at least three key safety devices to protect personnel, equipment of boiler operators and technicians (4point)

_____

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Identifying and reporting Maintenance requirements

2.1 Identifying and reporting Maintenance requirements

Maintenance helps to protect the capital investment and ensures an effective and economical expenditure in operating and maintaining the boiler facilities. Preventive maintenance is more economical and provides for reliability in operations of the boiler facilities.

2.1.1 Identifying Maintenance requirements

- It should produce the maximum quantity of steam with the minimum fuel consumption.
- It should be more economical to install.
- It should be rapid to meet the fluctuation of load.
- It should be capable of quick Starting.
- It should occupy a small floor space.

Maintenance of production equipment in industrial enterprises plays an increasingly important role. It is quite obvious that it can eliminate a number of risks associated with the business and ensure effective use of financial resources necessary to ensure the working order of the machinery and equipment of the businesses.

Fig. 1 Identifying Maintenance requirements

Maintenance helps to protect the capital investment and ensures an effective and economical expenditure in operating and maintaining the sewerage facilities.

Preventive maintenance is more economical and provides for reliability in operations of the sewer facilities. Properly performed maintenance can contribute to gaining a competitive advantage. The maintenance process enhances customer satisfaction

that is often directly dependent on the reliability, flexibility and speed of suppliers.

Properly performed maintenance can contribute to gaining a competitive advantage. The maintenance process enhances customer satisfaction that is often directly dependent on the reliability, flexibility and speed of suppliers.

2.1.2 Reporting Maintenance requirements

maintenance report details of each event in the time range, including the Setup/Takedown Time, Instructions, Event Time, Facility, Event, ID (Rental, Contract or Event), Service, and Customer.

Fig 2 Reporting Maintenance requirements

Self-Check 2	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/False

1. Maintenance helps to protect the capital investment and ensures an effective and economical expenditure (3point).

Test II: Choose the best

1. Which of the following is true about properly performed maintenance (3point)?
   A) Contribute to gaining a competitive advantage.
   B) Enhances customer satisfaction that is often directly dependent on the reliability, flexibility and speed of suppliers
   C) Increasing satisfaction through better products or services
   D) All
   E)

Test II: Short answer

1. Write importance of Maintenance (4point)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

Operation sheet 1	Shutting down the boiler

Procedure

Step 1: Check electric line breaker by testing voltmeter for our safety

Step 2. Clean internal and external part of couching machine by recommended detergent.

Step 3: Cover couching machine by plastic/other materials.

Step 4: Shutdown all lines of couching breaker from simple to complex

LAP Test 1	Performance Test

Name……. ID……..

Date…….

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 1 hour. The project is expected from each student to do it.

Task1 Shutdown the boiler

LG #87	LO6. Shutdown the boiler and prepare for an internal inspection.

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Shutting down the boiler
- internal and external cleaning
- Removing valves and fittings.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Shutdown the boiler
- identify internal and external cleaning
- Remove valves and fittings.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- The boiler need internal and external cleaning

1.1 The boiler needs internal and external cleaning

Clean boilers can also reduce emissions produced by a power plant because less fuel is required to produce the same amount of power

- Cleaning

1. Remove all hand hole plates
2. Clean breech and chimney
3. Swing burner out and cover with canvas or cloth
4. Open all fire doors, front and back
5. Punch or scrape tubes (operator should wear mask)
6. Vacuum out soot, front and back of tube section
7. Using wire brush, scrape and clean firebox / chamber (operator should wear mask)
8. Replace water gauge glass. Clean pressure gauge glass, fire-eye, ignition, orifice, burner, cup, cone and oil line filters
9. Grease and oil all pump, fan and burner fittings
10. Check fuel oil level; add fuel oil additive and have all tanks filled to top for summer storage

- Methods of boiler cleaning

  - Method for cleaning slag from a boiler is using high-pressure water jets. Thompson Industrial Services uses high-volume, specialized hydro blasting equipment, with pumps that can send up to1, 200 gallons per minute through the hoses. The company also uses remote-controlled robotic cleaning systems and other automated tools to clean boilers. One option for boiler

    Cleaning is an acoustic cleaning system, which can

Importance of boiler cleaning is clear, power plant operators have many options when it comes to techniques used to clear slag and ash buildup. Cleaning practices vary from offline cleaning, which requires a planned outage, to online cleaning that can occur while the plant is still operating

1.1.1 Internal cleaning

- Internal cleaning may include is carried out in accordance with statutory requirements regarding confined space entry and does not typically include chemical cleaning.

To clean internal boiler

Remove the burner part. Make sure all power is off and cool. Clean internal part of boiler by vacuum saucer.compresser and recommended chemicals.

Fig 1 internal cleaning of boiler

1.1.2 External cleaning

Regular cleaning is the best way for external parts of boiler to remove physical hazards (e.g. dust, foreign bodies, light particles, corrosion etc.)

To clean external part of boiler shutdown the boiler breaker and after giving time for cooling.

Fig 2 external cleaning of boiler

Self-Check 1	Written Test

Name…… ID…… Date……

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

Test I: Say true/ false

1. Clean boilers can also reduce emissions produced by a power plant (3point)

Test II: Choose the best answer

1. Which one of the following is true about cleaning (3point)?
   A. Remove all hand whole plates
   B. Clean breech and chimney
   C. Swing burner out and cover with canvas or cloth
   D. All

Test II: Short answer

1. Write the importance of boiler cleaning (4point)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

Information Sheet 2- Removing valves and fittings.

2.1 Removing valves and fittings.

2.1.1 Fittings

Fitting is an action or act of one that fits Small part, especially a standardized or detachable part of a device or machine.

Fig 1 fitting valve from boiler

❖ Type of Fittings

1. Collar
2. Elbow
3. Gasket
4. Union
5. Reducer
6. Tee
7. Nipple
8. Trap

2.1.2 Valves

Valve is a device that opens or closes to let things through or to control passage.

Control Valves are used to control the flow of boiler steam. The actuator is the device that applies the force to open or close the Valve.

The controller compares the process condition with the set value and sends a corrective signal to the actuator, which adjusts the Valve setting.

❖ A variety of control types exist:

- Pneumatically actuated valves - Compressed air is applied to a diaphragm in the actuator to open or close the Valve.
- Electrically actuated valves - An electric motor actuates the Valve.
- Self-acting - There is no controller as such - the sensor has a liquid fill which expands and contracts in response to a change in process temperature. This action applies force to open or close the Valve.

Fig 2 removing valve from boiler

https://youtu.be/2bb5vwPyZSE

Self-Check 2	Written Test

Name…… ID…… Date……

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers

Test I: Say true/ false

1. Control Valves are used to control the flow of steam (3point)

Test II: Choose the best answer

1. What are the two major categories of water treatment chemicals (3point)?

A. Coagulants B. Flocculants C. Chlorine D.A and B

2. Which one of the following chemicals used to purify water (5point)?

A. Chlorine B. Ozone C. Chlorine D.A and B

Test III: Short answer

1. Write the difference of removing valves and fittings (4point)

_____

_____

Note: **Satisfactory rating ≥ 5 points Unsatisfactory - below 5 points**

You can ask you teacher for the copy of the correct answers

LG #87	LO7. Shutdown the boiler and prepare for an internal inspection

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Recording Information

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Record Information

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

Information Sheet 1- Recording Information

1.1 Recording Information

Maintaining Workplace records

- Work place information related to maintaining food quality may include
  - Standard Operating Procedures (SOPs),
  - Manufacturer's specifications
  - Specifications and production
  - Quality specification
  - Log sheets
  - Basic data
  - Standard forms
  - Written and verbal instruction
- Information systems may include to:
  - Information systems may be print or screen based.

Fig 1 Recording Information

❖ General requirements

- Good documentation constitutes an essential part of the quality assurance system.
- Documents must be designed, prepared, reviewed, and distributed with care.
- Documents must be approved, signed, and dated by the appropriate competent and authorized persons.
- Documents must have unambiguous contents. The title, nature, and purpose should be clearly stated. Reproduced documents must be clear and legible.
- Documents must be regularly reviewed and kept up-to-date.
- Documents must not be handwritten;

Documentation system.

❖ Arrangements for the preparation, revision, and distribution of documents
❖ Necessary documentation for the manufacture
❖ Any other documentation related to product quality that is not mentioned elsewhere (e.g. regarding microbiological controls and product quality includes

- specifications
- sampling procedures
- testing procedures and records (including analytical worksheets and/or laboratory notebooks)
- analytical reports and/or certificates
- data from environmental monitoring, where required
- validation records of test methods, where applicable
- Procedures for and records of the calibration of instruments and maintenance.

Self-Check 1	Written Test

Name…… ID…… Date…….

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I: Say true/false

1**.** Workplace records are an important part of any work environment (3point)

Test II: Choose the best answer

3. Work place information related to maintaining food quality may include (3points)

   A. Standard Operating Procedures (SOPs),

   B. Manufacturer's specifications

   C. Specifications and production

   D. All

Test III: Short answer

4. Write five Types of records (4points)

_____

_____

Note: Satisfactory rating ≥5 points Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers

References

Jones, Robert C. (1979). Two Feet between the Rails (Volume 1 - The Early Years). Sundance Books. ISBN 0-913582-17-4.

^ "FOCUS on Industrial Archaeology (2007"). Hampshire Industrial Archaeology Society website. Archived from the original on 2007-11-10. Retrieved 2007-10-30.

Cadbury Limited (1976) .Edible composition and method of manufacturing same. U.S. Patent No. 4 081 559.

Jeffery, M.S. (1997). Chocolate technology in 1997 and into the new millennium. The World of Ingredients, (Feb.) 21–25.

Mori, H. (1990) .BOB: Ein Fettreifverhinderer. Süsswaren, 5**,** 200–209.

Mosimann, G. (1963). Physical and chemical reactions in connection with Mosimann's

AKNOWLEDGEMENT

We would like to express our appreciation to the TVET instructors and respective Regional TVET Bureau, TVET College/ Institutes, UNESCO Project (best education for African rise (BEAR)) and Federal Technical and Vocational Education and Training Agency (FTVETA) who made the development of this teacher training and teaching materials with required standards and quality possible

This teaching training and learning materials was developed on September 2020 at Bishoftu, Federal management institute ETHIOPIA

No	Name	Qualification	Educational background	Region	E-mail
1	Teshale Besufikad	B	Food science and post-Harvest Technology	Sidama	teshu44@gmail.com
2	Memiru Michael	B	Food Process Engineering	A.A	Lijelshaday@gmail.com
3	Zerfu Negash	B	Hotel mgmt.	Oromia	nzerfu@gmail.com
4	Meseret Niguse	B	Hotel & Tourism mgt	Oromia	mimimesi@gmail.com
5	Cheru petros	B	Food technology and process engineering	SNNPR	Chupeter143@gmail.com
6	Zelalem Taye	A	Leadership and Management	Amhara TVEDB/coordinator	Tayezelalem22”gmail.com